1. Amendments to the Claims:

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) A method for determining an optimal mode for a removal of cathode depositions from an electrode during an electrochemical machining of an electrically conductive work piece in an electrolyte by means of applying bipolar electrical pulses between the work piece and the electrode, one or more voltage pulses of an unipolar machining polarity being alternated with voltage pulses of an inverse polarity while a gap between the work piece and the electrode is maintained, said gap being filled by the electrolyte, ~~characterized in that for~~ wherein during said optimal mode an optimal duration of the pulses of the inverse polarity is selected, said optimal duration being determined from a first calibration carried out preceding the machining of the work piece and a second calibration carried out during the machining of the work piece.

2. (currently amended) A method according to claim 1, ~~characterized in that~~wherein the first calibration comprises determining a dependence between a variable having a range of values corresponding to a range of heights of the cathode depositions generated on an initially clean metallic surface and a range of pulse durations of a suitable pulse of the inverse polarity necessary to remove said depositions from said surface.

3. (currently amended) A method according to claim 2, ~~characterized in that~~wherein the first calibration comprises the steps of:

- performing a machining of a set of samples with unipolar machining pulses in order to yield a range of surface conditions;

- assigning variables characterizing the yielded surface conditions;

- applying a pulse of the inverse polarity having a pulse duration per sample in order to remove yielded surface conditions;

- performing a calibration of a dependence between the variables and the inverse pulse durations required to remove said yielded surface conditions from the samples.

4. (currently amended) A method according to claim 1, ~~characterized in that~~wherein the second calibration comprises the steps of:

- performing a machining of the work piece by applying one or more pulses of the unipolar machining polarity until an a-priori defined condition is satisfied, said machining resulting in a first condition of a surface of the electrode;

- assigning a variable characterizing the first condition of the surface of the electrode;

- performing a measurement of a first value of an operational parameter representative to the first condition of the surface of the electrode;

- performing an application of a pulse of the inverse polarity corresponding to the first condition of the surface of the electrode, said application resulting in a second condition of the surface of the electrode, parameters of said inverse pulse being determined from the first calibration;

- performing a measurement of a second value of the operational parameter representative of the second condition of the surface of the electrode;

- performing a calibration of the variable based on the first value and the second value of the operational parameter.

5. (previously presented) A method according to claim 2, ~~characterized in that~~wherein a height of the cathode depositions is selected as the variable characterizing the surface condition of the electrode.

6. (currently amended) A method according to claim 5, ~~characterized in that~~wherein a cathode potential is selected as the operational parameter.

7. (currently amended) A method according to claim 5, ~~characterized in that~~wherein in a region, corresponding to an interval between the unipolar machining voltage pulses, an area under a curve of the electrode potential is derived, said area being selected as the operational parameter.

8. (currently amended) A method according to claim 5, ~~characterized in that~~wherein for short intervals between unipolar machining voltage pulses a slope of the curve of the electrode potential is derived in an interval between the unipolar machining voltage pulses, said slope being selected as the operational parameter.

9. (currently amended) A method according to claim 5, ~~characterized in that~~wherein the absolute value of the first harmonics of the Fourier transform of a cathode potential pulse is selected as the operational parameter.

10. (currently amended) A method for electrochemical machining of an electrically conductive work piece in an electrolyte by applying bipolar electrical pulses between the work piece and an electrode, one or more voltage pulses of an unipolar machining polarity being alternated with voltage pulses of an opposite polarity while a gap between the work piece and the electrode in maintained, said gap being filled by the electrolyte, ~~characterized in that~~wherein said method comprises the steps of:

- establishing an optimal pulse duration for pulses of the inverse polarity for a removal of the cathode depositions from an electrode surface during the electrochemical machining, said optimal pulse duration being determined from a first calibration carried out preceding the machining of the work piece and a second calibration carried out during the machining of the work piece;

- performing a control of the machining of the work piece by means of a monitoring of an actual value of an operational parameter and comparing said actual value of the operational parameter to a preset value of the operational parameter;

- applying a pulse of the inverse polarity of the optimal pulse duration in case the actual value of the operational parameter is greater than the preset value of the operational parameter.

11. (currently amended) A method according to claim 10, ~~characterized in that~~wherein a height of cathode depositions is selected as said variable.

12. (currently amended) A method according to claim 11, ~~characterized in that~~wherein a cathode potential is selected as the operational parameter.

13. (currently amended) A control system arranged to control an automatic removal of cathode depositions from a surface of an electrode during a bipolar electrochemical machining, ~~characterized in that~~wherein said system comprises:

- probing means arranged to perform a measurement of a value of an operational parameter;

- calibration means arranged to perform a numerical calibration of a variable representative to a condition of the surface of the electrode based on the value of the operational parameter;

- a storage unit arranged to store a dependence between the variable and a duration of an optimal inverse pulse necessary to remove said condition;

- monitoring means arranged to monitor an actual value of the operational parameter;

- a logical unit arranged to compare said actual value of the operational parameter with a preset value of the operational parameter and to actuate an application of the optimal pulses of inverse polarity in case the actual value of the operational parameter is greater than the preset value of the operational parameter, parameters of the optimal inverse pulse being determined by the calibration and the dependence stored in the storage unit.

14. (original) An apparatus for electrochemical machining of an electrically conductive work piece comprising the control system according to claim 13.

15. (original) A computer program arranged to be loaded in to a computer and to control the computer, when loaded, to function as the control system as claimed in claim 13.